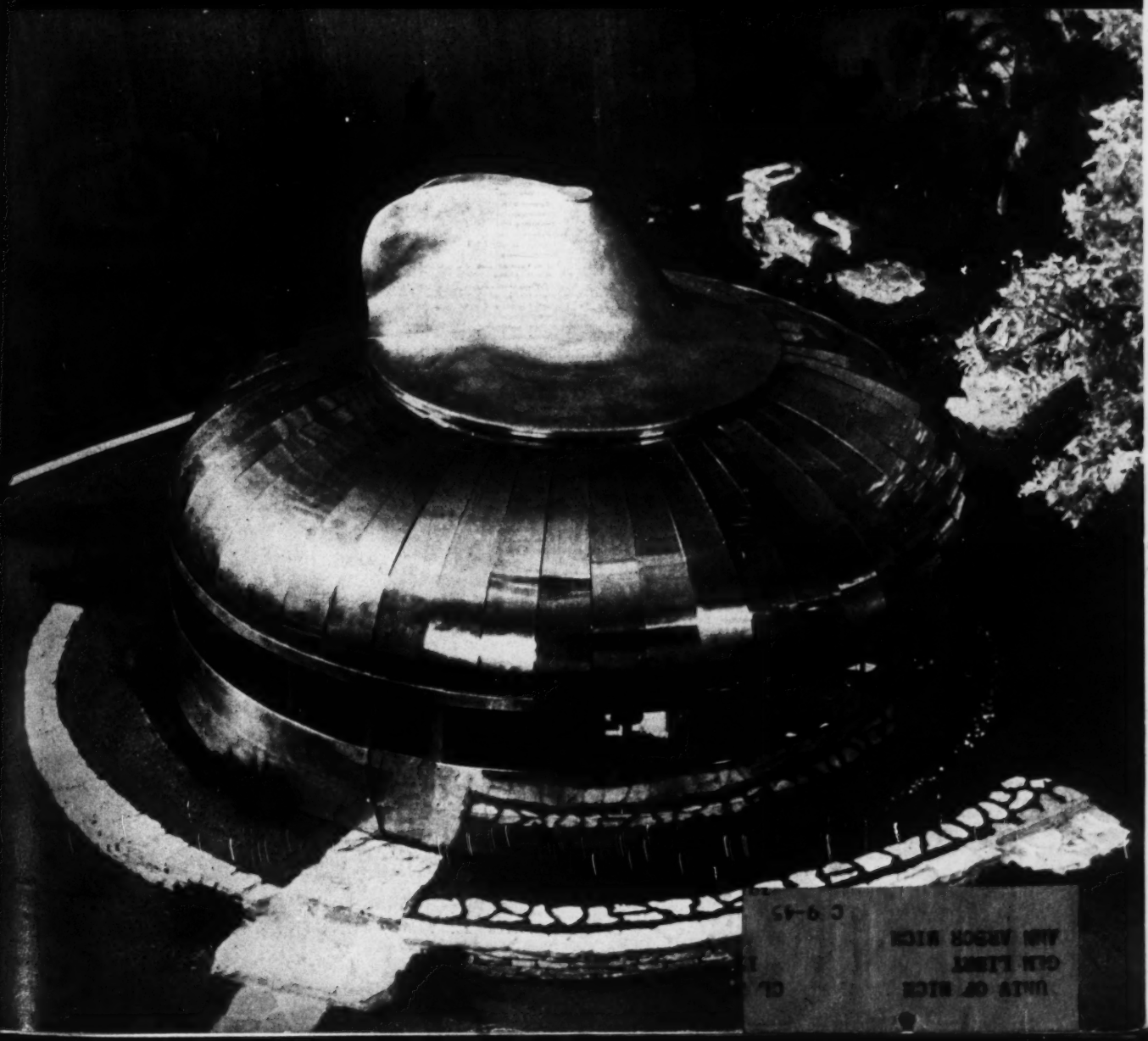
ENGINEERING NEWS-RECORD

Mass production of $6,500 house will use aircraft assembly techniques, high strength alloys



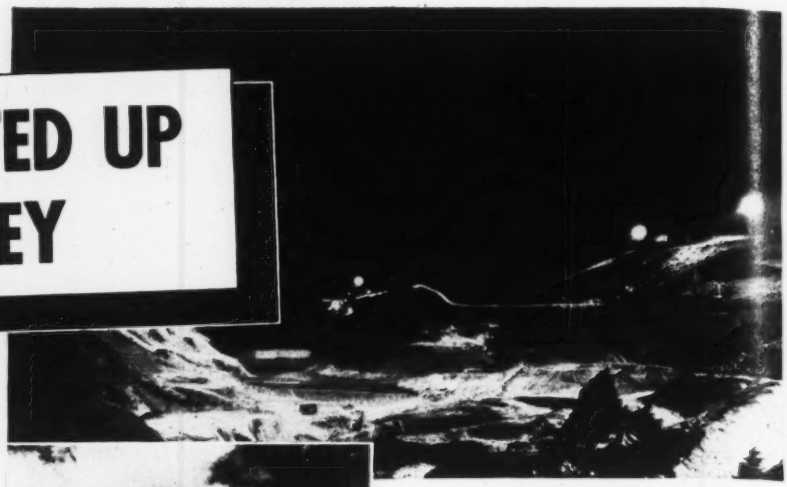
THEY LIGHTED UP A VALLEY

. . and speeded up a job with safety

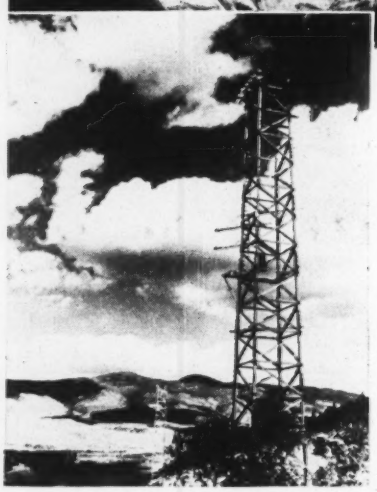
● The builders of Green Mountain Dam used a stationary system of lighting to illuminate the entire valley. Thus there was no need to string wires and install lights as construction of this earth-filled dam proceeded.

A day and night working schedule was maintained over the entire construction period of five years. Lighting facilities were independent of the progress of the work, approach roads were adequately illuminated so materials were moved safely and quickly to and over the site, and maintenance expense and expensive delays were minimized.

The Warner Construction Company of Chicago, accomplished this by placing the illumination problem in the hands of G-E lighting specialists, who studied the proposed project and came up with this novel system of illuminating the entire site. Five permanently located batteries comprising a total of 70 enclosed floodlights illuminated an area of 1,000,000 square feet. These G-E floodlights, with polished reflectors and clear glass doors, using 1500-watt, 125-volt Mazda lamps, were mounted on timber towers and poles approximately 300 feet above the foundation of the dam, and 40 feet above the finished crest. They were adjusted only periodically as the dam was brought up. Lights were controlled by a photo-electric cell that turned them on in the evening as natural light intensity dropped.



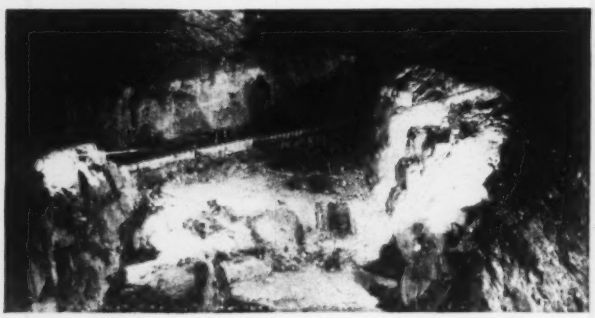
Night view of coffer-dam construction. Light from the five main batteries in the foreground enabled night shifts to accomplish just as much as day shifts.



(Left) Two 80-foot timber towers on the south, or left, abutment of the dam. Approximately 300 feet above the foundation of the dam.

A U.S. Bureau of Reclamation project, Green Mountain Dam is one of the largest earth- and rock-filled dams in the world. Power generated here has helped supply Colorado's war industries. Good lighting was probably one of the important factors in preventing night-shift accidents and delays.

The General Electric Illuminating Laboratory studies outdoor lighting problems of all types, makes illumination tests of equipment, surveys projects for better outdoor illumination, and offers a thoroughly competent service that is always available upon request. General Electric Company, Schenectady 5, New York.



Two small G-E floodlights at the power-house site supplemented over-all lighting that was provided by the main batteries.

Looking down 300 feet to the coffer-dam construction. A battery of 10 G-E floodlights (Type L-68) in foreground.

GENERAL ELECTRIC

655-47-3000

News of the Week

ENGINEERING NEWS-RECORD • MARCH 28, 1946 • VOLUME 136 • NUMBER 13

Panama Canal discussions envisage 135-ft. dredging

Meeting of engineers, dredging machine manufacturers, contractors, hears alternate plans for converting canal to a sea-level waterway over 12-year period

If the current Congress-ordered studies of the future course to be followed in enlarging the capacity of the Panama Canal and increasing its wartime safety should result in a decision to convert the locked waterway to a sea-level canal, could the dredging fraternity handle the unprecedented job that would be required? An answer to that question was sought March 19 and 20 in a conference at Philadelphia of dredge manufacturers, dredging contractors and Army Engineers assigned to the Panama Canal.

Conversion to sea-level

Called by Maj. Gen. J. C. Mehaffey, Governor of The Panama Canal, the conference was attended by 23 firms and some 75 individuals. Brig. Gen. Hans Kramer (retired), representing the Governor, shared direction of the conference with Col. James H. Stratton, director of civil works in the Office of the Chief of Engineers, who is soon to assume charge of the Panama Canal study project. The dredging job that would be entailed in a sea-level conversion scheme was outlined in a prepared paper by John G. Claybourn, superintendent, dredging division, The Panama Canal.

Two measures outlined

Mr. Claybourn outlined the two general plans that have been proposed. Under a "deep dredging" plan, all excavation would be accomplished to sea-level before any of the locks were removed, requiring dredging to the unprecedented depth of 135 ft. to attain a 50-ft. channel below the present Summit Lake elevation of 85 ft. By using a "stepdown" plan, excavation would be carried out in three steps, the top set of locks being removed and the lake level correspondingly lowered after each step; the "stepdown" plan would require dredging to a maximum depth of 80 to 90 ft., approximately the limit of present experience. Principal reason for considering the unprecedented deep dredging plan is to measure the possibility of avoiding the tremendous expense and hazard that would be encountered in removing the locks while maintaining traffic.

Estimated quantities of excavation in the conversion project run to 400 million cu. yd. of "earth" (325 million being "wet") and 300 million cu. yd. of rock (165 million being "wet"). About 100 million yards of the wet rock excavation would be in Gaillard (formerly called Culebra) Cut, the greatest construction task of the project.

A 12-yr. construction period

Most discussion centered on the possibility of building equipment with which to accomplish the deep dredging plan during an estimated 12-yr. construction period, a basis being provided in suggestions by Mr. Claybourn that unprecedented dredge sizes should be considered. For example, he envisioned a 40-in. cutter-head suction dredge, while 32-in. is the largest in service; a 25-yd. dipper dredge as compared with a 20-yd. maximum at present; a ladder dredge with 5-cu. yd. buckets as compared with an existing 2-yd.; and a 25-yd. clamshell where 15-yd. is probably the largest yet built. Power, speed of maneuvering, extreme depth, dependability, maintenance cost and annual output were other factors discussed. Pipeline, barge, and belt conveyor disposal were also considered.

Unusual Dredge Problems

Problems with hydraulic dredges seem to center on suction pipe vacuums, amount of solids that can be lifted from great depths and spud design; with dipper dredges on the long "stick" and methods of applying digging power to the dipper at great depths; with ladder dredges on the tremendous weights to be handled if each of the 50 or more buckets is to weigh from 3 to 7 tons; and with the clamshell on speed of operation, cable reeving and digging efficiency.

Cut business building to aid housing

Acting to speed construction of homes for veterans, the federal government March 26 issued, effective immediately, its expected order (*ENR* March 21, vol. p. 393) virtually to cut off construction of all commercial buildings.

Issued jointly by Housing Expediter Wilson W. Wyatt and Civilian Production Administrator John D. Small, the order permits completion of work already started—under certain conditions—but prohibits work on any new stores, office buildings, roadhouses, theaters or factories.

It does not affect construction on homes already authorized under the veterans program, or roads, streets, bridges, sidewalks, fences, tunnels, subways, pipelines, sewers, power or utility lines, wells, dams or canals, or military construction.

Construction already started may continue, provided that work is being carried on at present, and that any of the materials which are to be an integral part of the structure were incorporated into it on the site before March 26.

The order does not apply to construction, alteration and repair work which comes within the following limits:

Houses designed for five or fewer families, and garages and other residential property—$400 per job; hotel, resort, apartment house or other residential structures designed for occupancy by more than five families—$1,000 per job; Commercial or service establishments, such as offices, stores, garages, theaters, radio stations, gasoline service stations—$1,000 per job; farm buildings, excluding farmhouses—$1,000 per job; churches, hospitals, schools, public buildings, $1,000 per job; factories, plant or other industrial structures used for manufacturing, processing or assembling—$15,000 per job; other structures—$200 per job.

No job that would ordinarily be done as a single piece of work can be subdivided for the purpose of coming within the cost allowances.

NEWS IN BRIEF

In telegraphic form, here are latest news developments on the engineering and construction front during the week.

Housing—Privately-financed residential construction during February totalled $175,000,000, the Department of Commerce announced. . . . The *Atlanta, Ga.*, housing authority, said it was preparing plans for an $11,500,000, 2,500-unit project. . . . *Rochester, N. Y.*, planned to revise its building code to permit erection of 48 prefabricated houses on city-owned lots. . . . *Quebec, Que.*, approved a contract with Wartime Housing, Ltd., for erection of 500 more dwellings for veterans. . . . The Smelo Construction Co. planned 500 residences, to cost $3,000,000, in northeast *Philadelphia, Pa.* . . . Temporary housing originally erected at *Sidney, N. Y.*, is being moved to *Binghamton* to provide 80 emergency units for veterans.

Water Supply—*Richmond, Va.*, received FWA funds for planning a $1,000,000 waterworks addition. . . . *Hartshorne, Okla.*, employed engineers to prepare plans for a waterworks improvement program. . . . *Geneseo, Ill.*, will build a $110,000 water-softening plant. . . . *Concord, N. C.*, asked bids on water department improvements expected to cost $350,000. . . . *Carbondale, Ill.*, planned a $250,000 reservoir.

Highways—*Mississippi* received bids March 26 on $2,500,000 of work on its $50,000,000 road program. . . . The *Massachusetts* Postwar Highway Commission asked the legislature for $2,000,000 to prepare plans for an arterial highway in *Boston* that will cost an estimated $50,000,000. . . . *Wichita, Kan.*, planned spending $350,000 on streets in 1946. . . . *Oklahoma* expects to have most of its 1946 highway program under way by midsummer. . . . *Delaware* has plans completed for $15,830,000 of road work for 1946. . . . *Florida's* State Improvement Commission approved plans for a $1,000,000 bridge across the Halifax River at *Daytona Beach*. . . . *North Carolina* placed orders for 20,000,000 pounds of bituminous materials for use in surfacing and resurfacing state roads.

Bond Issues—*Cleveland, Ohio*, will vote May 7 on issues totalling $50,000,000 for city and county improvement programs. . . . *Charlotte, N. C.*, votes April 23 on a $12,000,000 issue for enlarging sewer and water systems and other projects. . . . *Alliance, Ohio*, votes May 7 on issues totalling $1,100,000 for school buildings. . . . *St. Joseph, Mo.*, will vote on a $77,000 bond issue for road repairs. . . . Six *Mississippi* towns will hold elections for $575,000 in bonds to finance municipal work. . . . *Pittsburgh, Pa.*, Allegheny County commissioners prepared plans for an election on $30,000,000 in bonds to finance to improve the city's airport, and highway and bridge connections.

School Buildings—*Oklahoma City, Okla.*, must spend $889,000 to repair city schools. . . . Forty percent of *Minneapolis, Minn.*, schools are in need of repairs, a survey showed. . . . The University of *Rochester, N. Y.*, has appropriated $550,000 for an addition to its physics building. . . . The University of *Georgia* plans a $2,400,000 series of dormitories. . . . New buildings for the *Louisiana* Vocational Agricultural School at Alexandria will cost $310,000.

Industrial Building—The Suppiee-Wills-Jones Milk Co. planned a $4,000,000 plant at *Philadelphia, Pa.* . . . Sears, Roebuck and Co. announce a $1,000,000 building at *Kansas City, Mo.* . . . *Minneapolis, Minn.* and *Oklahoma City, Okla.*, reported huge increases in building permits issued. . . . Stanolind Oil and Gas. Co. planned a $4,000,000 gas plant near *Houston, Tex.* . . . W. T. Grant Co. planned a $1,250,000 store building at *Syracuse, N. Y.*

Toronto subway to be 1/3 open cut construction

The $24,000,000 subway for Toronto, Ont., recently approved by city electors, will be constructed as a subway for about two-thirds of its length; the remainder of the line will be open cut construction. This decision was arrived at after discussions between the Toronto Transportation Commission—operating the city's publicly-owned street railway system—and the board of control of the city council.

Calendar of Meetings

NATIONAL

President's Highway Safety Conference, Washington, D. C., May 8-10.

American Concrete Pipe Association, 38th annual convention, Edgewater Beach Hotel, Chicago, Ill., April 11-12.

American Society of Civil Engineers, spring meeting, Bellevue-Stratford Hotel, Philadelphia, Pa., April 17-19.

REGIONAL

Indiana Section, American Water Works Association, Union Building, Purdue University, Lafayette, Ind., April 2-3.

Canadian Good Roads Association, annual convention, Chateau Frontenac, Quebec City, Canada, April 2-5.

Canadian Section, American Water Works Association, annual convention, General Brock Hotel, Niagara Falls, Ont., April 8-10.

Montana Sewage Works Association, Butte, Mont., April 11-12.

Montana Section, American Water Works Association, Finlen Hotel, Butte, Mont., April 12-13.

Arizona Sewage and Water Works Association, Tucson, Ariz., April 18-20.

Florida Engineering Society, 13th annual meeting, Jacksonville, Fla., April 25-27.

New England Sewage Works Association, Pickwick Arms Hotel, Greenwich, Conn., May 17.

Pacific Northwest Sewage Works Association, Gearhart Hotel, Gearhart, Ore., May 22.

Pacific Northwest Section, American Water Works Association, Gearhart Hotel, Gearhart, Ore., May 23-24.

New York State Sewage Works Association, spring meeting, Hotel Hamilton, Utica, N. Y., May 24-25.

San Francisco—Reflecting the rising trend of construction activities in California, building permits in 115 California cities during January rose 556 per cent over those of January, 1945. Total construction permits in the state's important cities during the entire past year was $323,313,624. Los Angeles led the state.

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Senate grants $336 million financing for Army Engineers' civil works program

Fund previously approved by House increased by $54,963,500 for flood control construction and $20,668,000 for rivers and harbors

The Senate March 19 passed the War Department Civil Functions Appropriation Bill (H.R. 5400) after adding $75,631,500 to the $260,762,250 amount approved by the House Feb. 7 (*ENR* Feb. 14, vol. p. 249).

The House had approved a total of $159,979,000 for flood control work, including: new construction, $96,150,000; studies and planning, $10,900,000; Lower Mississippi, $46,500,000; emergency construction and maintenance, $2,924,000; Sacramento River, $2,000,000, and Fort Peck power plant, $1,505,000. Senators increased this total by $54,963,500.

The Senate increases were of two types: An addition of a number of entirely new projects, and increases in some items approved by the House.

Largest of the amounts added include: Lookout Point Reservoir, Ore., $4,000,000; Cherry Creek Reservoir, Colo., $3,968,500; Whitney Reservoir, Tex., $3,000,000; Hulah Reservoir, Okla., $3,000,000; Tenkiller Ferry Reservoir, Okla., $1,500,000; Wichita and Valley Center, Kans., $1,500,000; Boeuf, Tensas Rivers and Bayou Macon, La., $1,500,000; and San Gabriel River, Calif., $1,300,000.

For each of the following projects $1,000,000 was added: Isabella Reservoir, Kern River, Calif.; Kings River and Tulare Lake Area, Calif.; Cannelton, Ind.; Sutton Reservoir, W. Va.; and Big Sunflower River and tributaries, Miss.

Increases for projects already listed in the bill include: Fort Randall Reservoir, S. Dak., $4,000,000; San Angelo Reservoir and floodway, Tex., $2,000,000; Bull Shoals Reservoir, Ark., $2,000,000; Wolf Creek Reservoir, Ky., $1,300,000; Center Hill Reservoir, Tenn., $1,300,000; Garrison Reservoir, N. Dak., $1,000,000; Allatoona Reservoir, Ga., $1,000,000; and Clark Hill Reservoir, Ga. and S. C., $1,000,000. Money to plan two flood control projects was deleted by the Senate. This fund consisted of $400,000 for Tuttle Creek Reservoir in Kansas and $100,000 for Oologah Reservoir in Oklahoma.

In addition to the $97,882,750 for rivers and harbors work approved by the House, the Senate added 23 new projects, totalling $20,668,000. Major projects included in this new list are: Columbia River, Umatilla Dam, $4,400,000; Gulf Intracoastal Waterway, $3,800,000; St. Johns River, Fla., Jacksonville to the Ocean, $2,689,000; Savannah Harbor, Ga., $1,651,000; Crescent City Harbor, Calif., $1,610,000; Cape Fear River, N. C., $1,465,000; and Wrangell Narrows, Alaska, $1,000,000.

Site chosen for bridge across Allegheny River

The commissioners of Allegheny and Westmoreland counties, Pa., have agreed on a site for a new bridge across the Allegheny River. The site is one recommended by Works Director John F. Laboon and is from just above Ross Street, Tarentum, to a point above the New Kensington borough line.

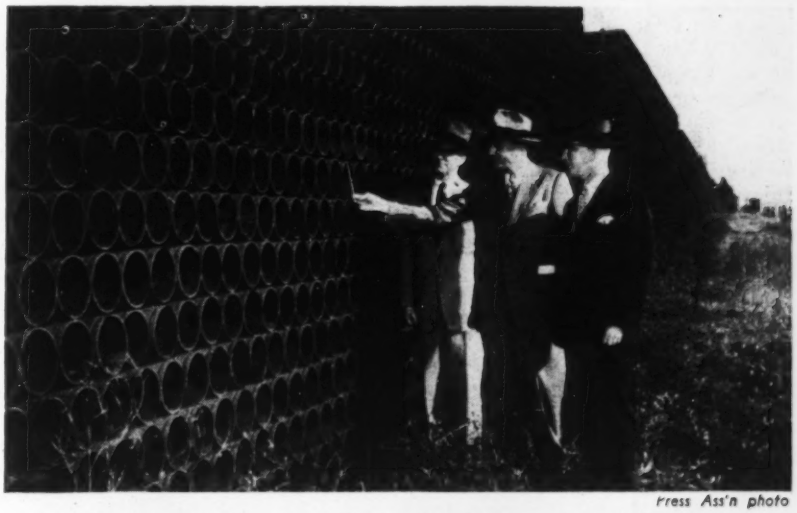
The bridge is estimated to cost $3,960,000. Of this, the state has already appropriated $2,000,000. The bridge would be 8000 ft. long and connect state highways 28 and 56. On the Westmoreland side, a 65-ft. cut through the hillside would be necessary, while a long viaduct from the edge of the river across the railroad and several streets to Highway 28 would be involved on the Tarentum side.

Registered engineers only may practice in Ohio

The Ohio Society of Professional Engineers has won its injunction suit against Designers for Industry, Inc., Cleveland, to enjoin the defendant perpetually from causing or authorizing any officer, director, agent, or employee who is not a registered professional engineer under the laws of Ohio to practice or offer to practice engineering in Ohio. The injunction, granted by Common Pleas Court, is the first such suit the Ohio society has filed, and amounts to holding valid the engineers registration act of Ohio, sustaining a society contention that injunction suits may be brought against non-registered persons who attempt to practice engineering.

Seattle demands experience

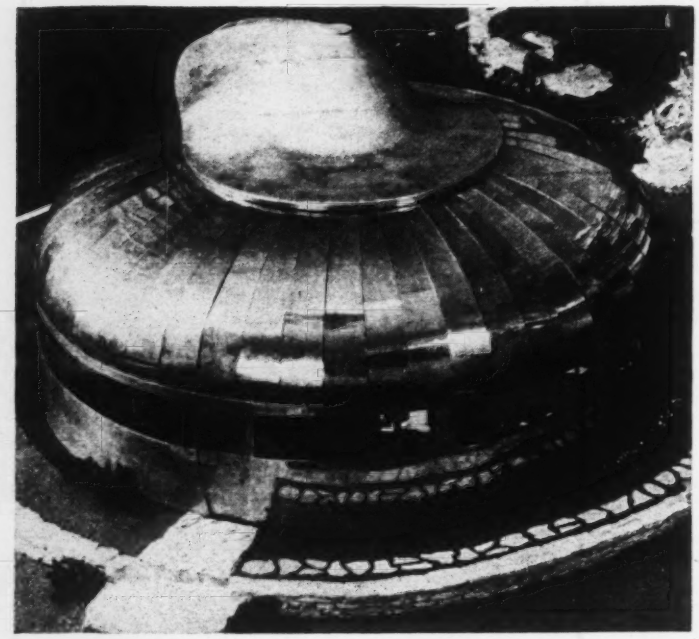
A new charter approved by the voters of Seattle, Wash., stipulates that the city engineer shall have "actually engaged in the practice of his profession for 10 years immediately prior to his appointment; shall be licensed to practice his profession in the state; shall be a civil engineer of high professional and ethical standing, and shall be qualified not only to direct but also to conceive and design engineering work." It also requires that the building superintendent shall be a structural engineer or architect who shall have been actively engaged in the practice of his profession for five years.



Press Ass'n photo

Government sells "invasion" pipe to civilians

The War Assets Corporation speeded the beating of "swords into ploughshares" at Oakland, Calif., recently by the sale of some 600 miles of "invasion" pipe to three western companies. The buyers, who said they paid close to $900,000 for the 12,500 tons of pipe that spreads over some 10 acres, are shown looking over their stock. They are, left to right: Louis Dulien of Seattle; Max Grimes of Denver and M. Jacobs of Oakland. They will resell the 6-inch pipe, with couplings at prices scheduled in accordance with the quantity wanted.



Circular roof, wall and floor of the Fuller house are suspended from a central mast of stainless steel by means of a system of tubular compression rings and tension rods. The domed roof is formed with segments of aluminum sheet stretched tight over W-shaped beams, the valleys of which serve as drainage channels for any leakage between abutting segments. Ventilator on top draws air through house.

Low-cost "Engineered" housing

The times have finally caught up with the ideas of R. Buckminster Fuller who in 1927 applied some original engineering concepts to house design. Last week Fuller Houses, Inc., announced that mass production of a $6,500 metal house, hemispherical in shape, would soon begin in the Beech Aircraft Corp. plant at Wichita, Kan.

Mr. Fuller's design figuratively and literally revolves around a central mast or column. The entire house is suspended from this mast of stainless steel, the skeleton structure consisting of a compression-tension cage of metal members over which is stretched a skin of aluminum alloy. The outside diameter of the house is 36 ft.

The cage itself features the use of three compression rings made of steel tubing—the smallest located at the top of the mast, a second larger ring halfway down the roof, and the third and largest forming the perimeter of the base of the roof. The top ring is attached to the mast by criss-crossed tension rods (like the spokes of a wire wheel). The same type of triangulated construction connects the remaining compression rings, holds up the floor and extends to a ground anchorage.

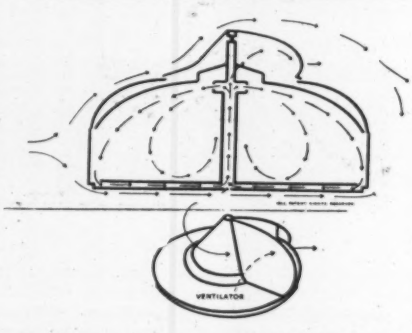
In the Fuller house the total compression element has been combined in the central mast which provides an overall height of 22 ft. and a floor to ceiling height of 16 ft. The roof, wall and floor are suspended from secondary web spreaders at the top of the mast. The house is said to articulate, which means that the various structural components are joined in a mechanical system such that when pressure is applied at any one point the resulting strain is distributed throughout the entire structure.

This light assembly, in which the walls have no weight-supporting function, results in a structure weighing only ½ lb. per cu. ft.

Manufacture and distribution

Basic principles of the structural design were evolved by Mr. Fuller in 1927. Production of the house, however, is said to have awaited development of lightweight, high strength aluminum and steel alloys, coupled with mass-production techniques.

War developments in aircraft manufacture have made available both the materials and the manufacturing techniques. This led to an arrangement with the Beech Aircraft Corp. to undertake production, which is expected to reach 50,000 a year early in 1947. Distribution will be handled through licensed sales and service agencies located throughout the country, similar to those used by the automobile industry.



Ventilator arrangement provides for unrestricted flow of air. The heating unit, two-thirds of the way up the mast, moves warm air under the floor and up through the mast.

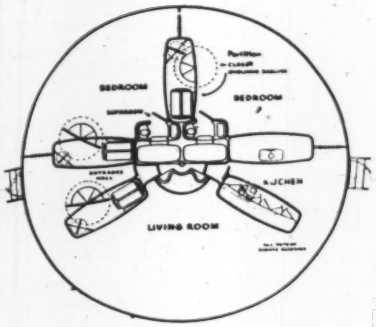
House arrangement

In contrast to the conventional house of minimum FHA standards and 625 sq. ft. of space, which weighs about 40 tons, the Fuller house has a floor area of 1,017 sq. ft. has a total weight, including a complete kitchen unit, of only 4 tons. This will permit shipping of the entire house, in parts, with relative ease. Assembled, but exclusive of the land, the selling price is expected to be $6,500.

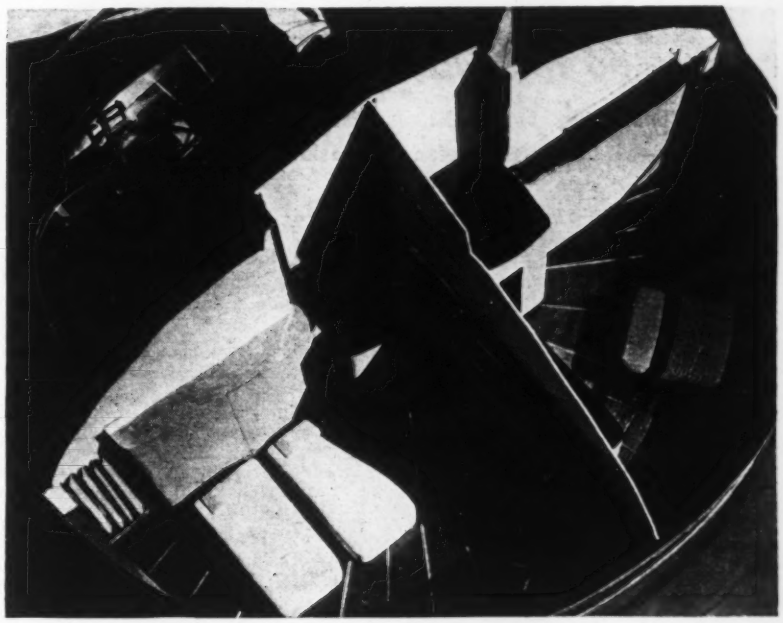
The house features two bedrooms, two baths, living room, foyer and a completely equipped kitchen; the latter contains such facilities as an automatic dish washer, deep-freeze unit and garbage-disposal unit. Included with the house is a heating and de-humidifying unit.

In making public the details of the house Mr. Fuller emphasized that it was not a prefabricated unit, but a mass-produced house to be assembled from parts at the site. "Prefabricated houses are assembled from panels and sub-assemblies built at the factory", said Mr. Fuller, "and utilize conventional building materials. We will not compete for materials, labor or plant facilities.

It was admitted by Mr. Fuller that one of the big hurdles to be overcome will be securing its acceptance under existing building code regulations.



Roof and ceiling removed to reveal interior arrangement. The sketch shows a floor plan of the 36-ft. dia. house, which provides 1,017 sq. ft. of space. Power, plumbing and ventilation service accessories are grouped around central mast, while partitions contain shelves and storage space.



Prefab housing goal seen as too high

The Federal government's goal of building some 250,000 permanent prefabricated homes in 1946, and 600,000 such units in 1947 is far above what can be reasonably expected, the statistical staff of the McGraw-Hill Publishing Co. said in a recent report.

The report was prepared on the basis of figures released by the Civilian Production Administration and independent surveys of the housing field, to throw a proper light on the nation's current housing shortage and solutions for it (*ENR* March 21, vol. p. 393).

Experts consider that production of 400,000 units by the end of 1947 would be a substantial achievement, the report said. For one thing, there are not enough prefab manufacturers in the business. According to the Prefabricated Home Manufacturers Institute, there are in this country only 70 firms with an annual capacity of 162,000 dwelling units.

However, a bigger obstacle than a lack of capacity is a shortage of plywood, which seems likely to be the basic material in prefabrication. Any projected expansion of plywood capacity would run into shortages of machines and lumber.

Other hurdles which must be overcome are:

The difficulty of obtaining enough capital to get production going on a scale large enough to permit reasonably low costs.

Building codes and trade union restrictions prohibit prefabrication in many localities.

No company has yet produced houses on anything like the scale needed for economic operation.

An efficient distribution system is lacking and must be created.

In a shortage market for building materials such is sure to obtain for the next two years, at least, it will be difficult for prefabricators to get materials and components.

There is some sales resistance to prefabrication as people are not educated to the idea and have had disappointing wartime experience with an inferior product.

To remove these obstacles, the Housing Expediter offers six proposals:

1) Guaranteed markets—the government would agree to buy any units which a qualified producer could not sell through normal private distribution channels within a reasonable period.

2) Channeling materials to prefabricators.

3) Rapid tax amortization of new facilities.

4) Funds for research to develop new building materials and new methods.

5) Local committees to revise building codes and union rules.

6) FHA insurance of mortgages to make it possible for veterans to purchase prefabricated homes.

Anti-rat fight started by St. Louis authorities

Plans to establish a municipal agency for the control and eradication of rats in the city of St. Louis, Mo., have been announced by Mayor Aloys P. Kaufmann. The new agency would be known as the rat control section of the city's health division.

There had also been a proposal for the creation of an independent division of rodent control, but that idea was voted down by the Board of Estimate and Apportionment after Henry S. Caulfield, Director of Public Welfare, told the board that rat control work should be under the health division.

The new rat control program was evolved by Health Commissioner Joseph F. Bredeck and John Buxell, chief sanitation engineer. The St. Louis "Post-Dispatch" has pointed out that only ten per cent of the city's area is free from rats.

The local circuit court grand jury also has recommended a rat control program for St. Louis, calling for municipal collection of refuse; adoption of the sanitary fill method of rubbish and garbage disposal; making a charge on householders' water bills for rubbish collection; enforcement of existing garbage storage ordinances; and enactment of a rat-proofing ordinance.

When there is danger of bubonic plague among rats, the U. S. Public Health Service steps in, as it did in the case of Tacoma, Wash., a year ago (*ENR* Feb. 8, vol. p. 162).

Urge simplifying contract procedure to speed highway construction awards

Mississippi Valley road officials discuss current highway building problems—E. L. Roettiger elected president of group

A recently-announced Public Roads Administration policy that ties current highway building costs to 1940 price levels may seriously impede road construction programs in Mississippi Valley states. This was feared by delegates to an annual meeting of the Mississippi Valley Conference of State Highway Departments last week.

Holding their 37th annual session at Chicago March 15-16, delegates viewed with open alarm a PRA dictum that detailed analyses of contract bid prices in excess of 35 percent above those of 1940 must be submitted to PRA's Washington, D. C., offices for examination and study, to obtain concurrence before contracts for federal-aid projects are awarded.

Fearing that such delaying action might impede their construction programs, many delegates said that some of their 1940 unit prices were substantially lower than average prices over several prewar years. With this situation obtaining, it might be necessary to delay award of contracts until PRA approval could be obtained—even though the contractor's bid was below engineers' estimates previously prepared.

PRA promises relief

Some relief from this potential bottleneck was anticipated, however, when H. E. Hilts, deputy PRA commissioner, revealed that, effective Mar. 15, PRA division engineers may concur in the awarding of contracts in which unit price bids do not exceed 1940 prices by more than 50 percent, providing a detailed supplemental analysis of the bids justifies the award.

In a formal resolution the highway officials requested PRA to return to the prewar policy of giving full authority to its division and district engineers for concurrence in the awarding of contracts by highway departments for federal-aid work.

Mr. Hilts declared, in answer to questions from the floor, that it was not the intent of his department to invoke "any iron-bound rule" on such procedure. By way of an example, he pointed out that PRA concurrence had been given in the recent awarding of a contract by one state highway department, although some of the prices in the low bid exceeded 1940 prices by 64 percent. This was a case where a detailed analysis of the contract prices justified the award, he said.

"The PRA is anxious to do its part in stabilizing conditions in the highway construction industry," he added, "and the 35 percent rule appeared to be a substantial level at which to start reviewing detailed analyses of bids in connection with awarding contracts."

Federal-aid program status

In his prepared paper, Mr. Hilts summarized the status of the federal-aid program as follows:

As of Mar. 2 the amount of federal-aid work programmed and authorized, and which is in various stages of completion, represents a total estimated cost of $797,500,000. Of this amount, 72 percent is on the primary federal-aid system, 19 percent on the secondary system and 9 percent on urban extensions of the federal-aid primary system. Of this total, $320.800,000 or 40 percent represents work in the Mississippi Valley

Between Sept. 1, 1945, and Feb. 15, 1946, contracts were awarded aggregating about $100,000,000 and about $15,000,000 worth of contracts were rejected.

Build for future defense

Viewing the national highway program in its entirety, Mr. Hilts warned that the shortcomings of this country's highway transport system during the last emergency must be kept constantly in mind in order to cope better with any future emergency, should one occur.

He called for fuller cooperation between federal, state, county and municipal organizations in the discharge of their obligations to provide "an integrated system of highways that will serve the most users for the funds expended." Design standards should be based on traffic requirements of at least 20 years after the date of construction, asserted Mr. Hilts, and the full use of blighted areas usually surrounding the central business districts should be utilized when necessary in designing expressways in urban areas.

Costs to remain high

The strongest force for the reduction of highway construction costs will be the competition within the industry for more efficient methods of construction, according to H. E. Foreman, managing director, Associated General Contractors. "Since this competition can be exerted only as the highway program proceeds, it is obvious that nothing can be gained by any highway department holding up its road construction to see what will happen," he said.

Due to the magnitude and complexity of the problem, Mr. Foreman made no specific predictions as to what highway costs will be in the next few years. "Contract prices undoubtedly will remain substantially above those prevailing before the war, due to the uncertainty of wages, materials and government regulations."

Meanwhile, said Mr. Foreman, the highway department can reduce the cost of its construction considerably by: (1) eliminating so far as possible items of work requiring hand labor in structures and in grading; (2) designing concrete structures to permit the use of standard forms, thus saving labor and lumber; (3) award only such projects as

ENR staff photo

Prominent engineers in attendance at the Mississippi Valley Conference included (left to right): Glen R. Logue, director of construction, Kentucky State Highway Department (1945 president); W. W. Polk, chief highway engineer, Illinois; Hal H. Hale, executive secretary, AASHO; and E. L. Roettiger, Wisconsin state highway engineer, newly elected president.

can be finished in one construction season; (4) determine an equitable apportionment between the contractor and the department covering certain risks due to current uncertain conditions affecting construction; (5) study refinements in materials specifications and earth compaction to determine where such refinements become more costly than necessary; and (6) use pipe culverts for drainage where possible.

His suggestions carry the approval of the Joint Cooperative Committee of the AASHO and the AGC.

Contractors not to blame

Present-day battles of "economic giants" will have some adverse effects on the speed of implementing the national highway program, according to Hal H. Hale, executive secretary, AASHO, who spoke on the current status of the national highway program. He said that contractors should not be blamed for the relatively small amount of highway work placed under contract during the past few months, since they are faced with a multitude of uncertainties, particularly regarding the availability and costs of labor and materials and, in some cases, the delivery dates of steel and timber.

Mr. Hale predicted that it would be midsummer or later before contractors can expect the delivery of steel on the job with any degree of certainty.

To date, said Mr. Hale, Congress has appropriated $175,000,000 of federal funds for highway construction under the 1944 Act and, based on past experience, additional appropriations can be expected as they are needed.

Group meeting recommendations

Much of the 2-day session was given over to group meetings of the various divisions of the highway departments. Out of the administrative officials meeting came the recommendation, approved by the conference as a whole, that each member state invite three county representatives to attend subsequent conventions in the interest of promoting closer state-county cooperation.

The construction engineers group urged extensive investigations as to the relative merits of all kinds of curing compounds for Portland cement concrete, in conjunction with the Highway Research Board.

New officers

E. L. Roettiger, state highway engineer of Wisconsin, was elected president of the association for 1946, succeeding Glen R. Logue, director of construction, Kentucky State Highway Department. R. C. Keeling, state highway engineer of Kansas, was elected secretary.

See politics back of two works officials' removal

Last week the people of Pennsylvania and Massachusetts learned of summary action taken by their respective governors leading to the dismissal of two prominent public works officials—Secretary of Highways John U. Shroyer of Pennsylvania, and Herman A. MacDonald, commissioner of public works of Massachusetts since 1940.

Mr. Shroyer was removed by Gov. Edward Martin who charged him with "disloyalty" following a speech Mr. Shroyer made in his role of an anti-organization Republican candidate for Governor. Ray F. Smock, of Meadville, has been appointed his successor.

Gov. Maurice J. Tobin of the Bay State said he would base dismissal proceedings against Mr. MacDonald this week on what he said was "inefficiency in handling the federally-aided roads program", and on the ground that Mr. MacDonald's removal would be for the "good of the service."

However, supporters of Mr. MacDonald deny the charges and observe that his removal would enable the Governor to appoint a Democrat in his place and gain complete control of the Department of Public Works, the state's biggest spending and hiring agency.

Fight water hyacinth in southern streams

A determined fight is to be made by Army Engineers and others to overcome the menace of water hyacinth and other marine growths which are clogging streams in Louisiana, Mississippi and other southern states.

The Army has been fighting a losing battle against the weeds because of war-time shortages of men and material.

The work will be extended to all streams in his district, says W. E. Wunderlich, of the New Orleans office, engineer in charge of marine growth control. The program is being duplicated by the other Engineer districts of the Gulf states. The parish of St. Bernard alone has spent $100,000 recently in an attempt to clear its streams of vegetable obstructions.

The botanical description of the formidable water hyacinth is: "A tropical pontederiaceous floating aquatic plant having spikes of large blue flowers and roundish leaves with inflated. bladderlike petioles."

FWA sees works planning short of future needs

Plans for state and local government public works are now "far short" of the volume that will be required when manpower and materials become available, the Bureau of Community Facilities, Federal Works Agency, said in its semi-annual report released March 25.

More than half of 8,272 governmental units reporting in the survey said they had no projects either in the completed or design stage of plan preparation. The figures were forwarded to Senate and House committees surveying the needs for continued assistance on planning postwar projects.

The planning situation

In brief, the FWA said that as of Dec. 31, 1945, the planning situation was:

Acting without federal aid, states and their subdivisions had completed plans for some $961,144,000 in public works —about half of this total being accounted for by New York State alone.

In addition, with federal aid, state and local governments were preparing plans for public works estimated to total $564,932,000. Applications were under review for federal advances to prepare plans for projects with an estimated total volume of $1,121,165,000.

The Public Roads Administration, whose figures were included in the report, showed an estimated $750,000,000 of roads and highways completely planned and ready for bids, and $2,715,000,000 in the design stage.

Planning funds

As of the Dec. 31 date, advances for planning totalling $13,248,000 were approved, and applications under review on the same date were $29,076,000—which FWA said is about twice the remaining available funds.

The survey indicated that sewer, water and sanitation facilities, school and other educational facilities and hospitals account for about 71 percent of the proposed work.

Plans being prepared for new Seattle wharves

The Port of Seattle, Wash., is preparing preliminary plans for the construction of nearly a mile of modern shipping terminals on its waterfront, replacing obsolete piers.

Action by the state legislature may be necessary in the raising of funds, while federal aid also will be sought.

Compromise bill provides $500 million for a seven-year airport program

Aid to be matched on a 50-50 basis with maximum for one year limited to $100,000,000—Cities and local groups can apply directly to CAA for assistance under new program

A total of $500,000,000 of federal aid for a seven-year airport construction program was agreed upon recently by a Senate-House conference committee. Early passage of the compromise measure, which would result in a total program costing $1 billion, is expected.

The compromise is the result of several months work. An expenditure of $375,000,000 on a five-year program was approved by the Senate Sept. 12 (*ENR* Sept. 20, vol. p. 356), when the McCarran Bill was passed.

A total of $650,000,000 of federal assistance for a 10-yr. program was approved by the house when it passed the Lea Bill (H. R. 3615) in October (*ENR* Oct. 25, vol. p. 551). Periodically since then the committee has been working on a compromise.

Matching on 50-50 basis

The compromise bill would make the first aid available during the next fiscal year, which starts July 1, and would limit the federal expenditure to $100,000,000 during any one fiscal year. In general, the federal aid would need to be matched on a 50-50 basis by the local sponsoring groups. An exception would be in those states where the federal government owns more than 50 percent of the land, in which case the federal sponsorship could account for 62½ percent.

It is specified that 75 percent of the money, or $375,000,000, be apportioned among the states on a basis whereby population and area receive equal weight. The remaining 25 percent, or $125,000,000, would be spent at the discretion of the Civil Aeronautics Administration Administrator. He would take into account national air transportation needs and inequities to some states under the allocation plan.

The bill also authorizes $3,000,000 for airport planning by the CAA and $20,000,000 on a 50-50 matching basis for airports in the territories. The planning money would become available immediately with passage of the bill. Sponsoring groups would apply directly to CAA for funds for local projects.

Major aid for small fields

To prevent the use of all federal construction funds in a given year for building one or two big fields, CAA is required to submit to Congress estimates for expenditures on all Class 4 and 5 fields before making financial commitments for the large airports. Congress may veto these projects. At least 50 percent of the federal money must be spent on Class 1, 2 and 3 fields or the smaller airports.

Purchase of necessary land will be considered part of the airport cost, but no more than 25 percent of this cost can be borne by the federal government. Federal condemnation proceedings for acquisition of necessary land are prohibited. The bill stipulates that administration buildings are allowable costs but excludes hangars.

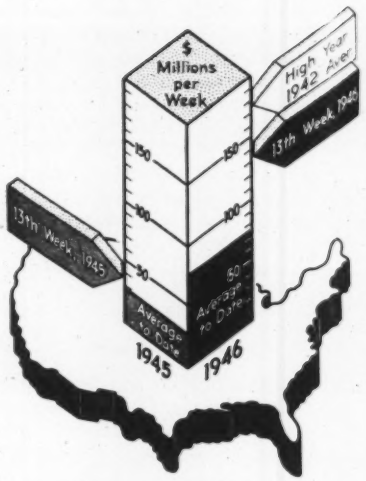
Ten California cities must stop pollution

The California Department of Public Health moved early this month to improve sewage disposal in the state when it ordered ten cities to stop dumping raw sewage into San Francisco Bay by Jan. 1, 1947.

Oakland, Berkeley, Alameda, Piedmont, Albany, Richmond, Emeryville, Hayward, San Leandro, and El Cerrito were the first on the list. C. G. Gillespie, chief sanitary engineer for the health board, He warned that failure to comply with the state law would result in injunction actions such as the one invoked against Los Angeles (*ENR*, Dec. 20, 1945, vol. p. 838).

It appeared that the move was the outcome of passage in February of the $90,000,000 so-called "Christmas Tree" bill over Governor Earl Warren's veto, allots funds to cities and counties for civic construction, but requires that sewage disposal facilities must be proven adequate before the money may be used for other purposes. Recalling the 39-year-old public health act requiring permits from the state for the dumping of raw sewage into streams, bays and ocean waters, Dr. Wilton L. Halverson, state director of the department of health, said no new permits would be issued and that all outstanding ones would be revoked at the end of the year.

However, according to John S. Longwell, chief engineer for the East Bay Municipal Utility District, plans are being rushed for a treatment plant to take care of six of the cities.



As Reported this week to ...
Engineering News-Record

CONTRACT VOLUME

Continental U. S. Only (Thousands of Dollars)

	Week of Mar. 28 1946	Cumulative 1946 (13 wks.)	Cumulative 1945 (13 wks.)
Federal	$13,440	$109,925	$227,323
State & Mun.	20,791	216,968	39,440
Total Public	$34,231	$326,893	$266,763
Total Private	100,681	653,390	113,444
U. S. Total	**$134,912**	**$980,283**	**$380,207**

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

Dollar Volume (Thousands)

Type of Work	This Week	Cumulative 1946 (13 wks.)	Cumulative 1945 (13 wks.)
Waterworks	$1,099	$26,968	$9,268
Sewerage	2,488	12,156	8,223
Bridges	2,328	24,389	7,628
Highways	11,172	111,830	21,575
Earthwork, Waterways	10,472	69,665	8,508
Buildings, Public	4,952	60,749	167,396
Industrial	27,531	253,911	81,427
Commercial	68,131	360,050	21,340
Unclassified	6,739	60,565	54,842

NOTE: Minimum size projects included are: Waterworks and waterway projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1946 (13 wks.)	Cumulative 1945 (13 wks.)
NON-FEDERAL	(Figures not available)	$172,398
Corporate Securities		51,667
State and Municipal		120,731
RFC Loans		.....
REA Loans		.....
FEDERAL		77,137
Total Capital		$249,535

ENR INDEX NUMBERS

Index Base = 100	1913	1926
Construction Cost	323.83	155.66
Building Cost	245.41	132.66
Volume	167	73

Army Engineers finish successful tests of floating seadrome model design

Tests conducted at request of Air Transport Command, which sought means of increasing loads on long over water flights

U. S. Army Engineers recently announced successful completion of tests upon a model seadrome which, when constructed full-size, can be anchored anywhere and provide landing strips for trans-oceanic plane traffic at any selected spot in mid-ocean. Design and testing of the drome was performed at the request of the Air Transport Command.

The principle of the drome was conceived in 1924 by a Philadelphia inventor, Edward R. Armstrong, and incorporates a design of vertical flotation that gives stability to the structure. When warfare in the Pacific was intensified, ATC became interested in the drome in the hope that such a drome would greatly increase the number of troops and tonnage of cargo that could be handled by air transport facilities.

The model used in the test was 280 ft. long, scaled down from a planned actual size of more than 6,000 ft. The principle upon which it is based is that surface disturbances of the sea—as wind and wave—are only surface disturbances. Below the surface there is a body of still, undisturbed water which deep-water sailors call "solid water."

The seadrome has its support in this "solid water", rather than upon the surface. Its deck is carried on a series of vertical columns, each column having a float or air tank far below the surface disturbances. At the bottom of each column is a ballast tank, to be filled with water or stored fuel-oil to give the column stability.

Thus the structure gives the appearance of an island resting upon piles.

Tests were conducted in a specially-built wave basin at the Sun Shipbuilding Yard, Chester, Pa. Because the major part of the cost and labor of testing was already expended when the war ended, and because the principle might be of great future military and commercial value, ATC decided to continue with the tests.

Under test, waves exceeding the largest of record in the North Atlantic were simulated and the performance of the model proved satisfactory. At no time did the flight deck become so unstable as to prevent aircraft from landing or taking off from its surface.

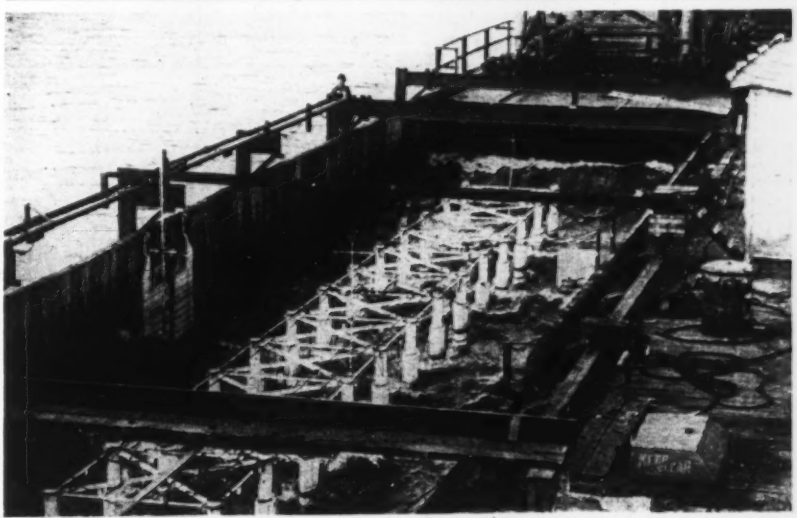
The project is now under study by a committee of the Air Forces to determine its defensibility. At conclusion of this study, ATC hopes to construct a quarter-section to actual size. This section would be towed to a station on the North Atlantic for a year's test.

Current design calls for two decks—including the top or flight deck—for the entire six thousand ft. of length, and two additional decks for a part of its length. Except for the control tower, no structures will be placed on its flight deck. Shops, hangar space, living quarters for drome crew, plane crews and passengers, mess halls, fuel storage areas all will be located on the lower decks.

It is also planned that the drome will be self-powered—power equivalent to that required for propulsion of a battleship would be necessary.

The mooring gear, designed by John S. Roebling Sons, consists of a huge floating anchor, sunk in place by opening seacocks over the station. Approximately four miles of specially designed and treated cable with mooring chain attached, necessary for anchorage in from three to four miles depth of water, is transported in the anchor. Little surface resistance is offered by the seadrome which, in model tests, actually rode forward against the anchor cable.

Since the vertical columns of the drome are more than a hundred feet in length, they are designed so that they telescope into themselves, giving the drome a shallow draft whenever required.



Although the test-basin waves are comparatively huge, model seadrome tested by engineers rides steadily at its anchorage.

Close-up shows supporting columns of seadrome. "Legs" are built to telescope into themselves in order to vary draft of the entire structure.

MEN AND JOBS

H. S. Mattimore has opened a consulting office at Colonial Park, Pa., and will specialize in concrete construction paving and similar work. For several years prior to 1943 he was with the Pennsylvania department of highways and recently has worked with the Navy Bureau of Yards and Docks on concrete floating drydock construction.

George H. Caviezel has returned to his position as county superintendent of highways, Livingston County, Pontiac, Ill. **S. H. Bergstrom** acted in his absence.

J. Lester Brown is project engineer for Peter Kiewit Sons' Co. on the construction of a contract on the Friant-Kirn canal, a unit of the Central Valley project. For the last seven years he was construction engineer with Mittag Bros. Construction Co. of Los Angeles on dams in Oklahoma, Missouri, Arizona and California.

Dean G. Edwards, formerly chief engineer for the Borough of Manhattan, New York, is now associated with Charles E. DeLeuw and Guy Kelcey, consulting engineers, New York, and DeLeuw, Cather & Co., Chicago. Mr. Edwards will be located at New York, where he has been identified with engineering and construction for many years, beginning with the original subway.

K. A. Poister, of Galion, Ohio, has resigned as county engineer to become safety-service director of Galion. He previously served as maintenance engineer.

Thomas O. Russell, construction engineer of Eugene, Ore., has reopened his engineering offices in that city following his return from Alaska and the Aleutians.

Virgil Van Dyke has replaced Otto C. Hardin as Clay County superintendent of highways, Louisville, Ill.

R. J. Ephland, district engineer of the Montana highway department at Billings, and **Mark Hopkins,** Helena, associate bridge engineer in the headquarters office, were awarded merit certificates recently in recognition of more than 25 years in public service.

J. M. Lowmen, who for 25 years served with the Seattle Water Department, has opened an engineering and surveying office on Bainbridge Island, near Seattle.

William Arsenault, assistant engineer of Dartmouth, N. S., has resigned to become town engineer of Springhill, N. S.

Nathaniel C. Saxe, structural engineer with The Kellex Corp., has opened an office at Brooklyn, N. Y., to practice civil and structural engineering.

Charles A. Jackson, Jr., chief of the engineering division, Seattle District, United States Army Engineers, has been transferred to Mobile, Ala., where he will supervise building of a $20,000,000 flood-control system and power dam at Allatoona.

W. Brass, Vancouver, B. C., has retired as assistant engineer of the Canadian National Railways at Prince Rupert after over 40 years service.

The Institute of Inter-American Affairs has announced that **Charles L. Pool,** sanitary engineer, has been appointed chief of party in Bolivia, to succeed **Maj. A. E. Williamson** who is returning after serving a year. Mr. Pool received a B.S. degree in sanitary engineering from Massachusetts Institute of Technology, and an M.S. degree in sanitary engineering from Harvard. He has had 20 years experience in sanitary engineering in the state health departments of New Hampshire, Connecticut, and Rhode Island. He also served as a member of the state board of engineers in Rhode Island.

Hector King Morrison, of Dartmouth, N. S., has been appointed district engineer, Canadian National Railways at Montreal, succeeding H. E. Smith who died recently.

Construction details on a new four-lane section of U. S. 66 near Dwight, Ill., are under discussion by (left to right) T. I. Fullenwider, assistant engineer of construction, Illinois State Highway Department, and H. C. Richmann and Norman Severson.

Above: C. L. BARNHARDT, has been with the Raleigh, N. C., engineering department for more than 20 years and city engineer since 1938. He joined the department early in 1925.

Above: C. S. Jarvis, senior civil engineer in the intelligence department, Office of the Chief of Engineers, Washington, D. C., conducts test on a truss at Timber Engineering Co.'s laboratories.

William B. Robards is the new county road engineer of Jefferson County, Ky. He was formerly district engineer for the state highway department.

H. M. Clark and **M. L. Fisher,** both of Elizabethtown, N. C., and **T. B. Jordan** of Kelly, N. C., have formed the Clark-Fisher-Jordan Construction Co. of Elizabethtown.

Karl M. Laurimore, county surveyor of Montgomery County, Crawfordsville, Ind., since 1934, has resigned to become assistant project engineer of the Crawfordsville district of the Indiana State Highway Commission.

Paul L. Schroeder, for the last 4 years director of engineering design for the Austin Co., Cleveland, Ohio, and formerly city engineer of Watertown, Wis., has joined the Genisot Engineering Co., Rhinelander, Wis.

William F. Egan, formerly of the Dry Dock Associates, Inc., and the United Engineers and Associates, has opened an engineering office in Philadelphia, Pa., to specialize in sewage disposal work.

George R. Wadeleigh, for 24 years manager of the engineering department of the West Virginia Pulp & Paper Co. is joining with **Frederick C. Clark** to establish a consulting engineering office in New York City, to specialize in pulp and paper work.

Hal S. Crain has resigned as vice president of the William Muirhead Construction Co., Durham, N. C., to set up Crain and Denbo, with E. M. Denbo, building and contracting; the Durham Excavating Co. and the Piedmont Housing and Construction Co. with J. A. Crain.

Lieut. H. J. Stimson and his brother, **O. E. Stimson,** have formed the consulting engineering firm of Stimson & Stimson, with offices in the Engineering Sales building, Houston, Tex.

Michael M. Salgo, formerly on the designing engineers staff of the Bureau of Yards and Docks, Washington, D. C., has been transferred to the superintending civil engineer's office in New York City as maintenance engineer for Naval Area I.

Vernon H. Smith has retired from the Virginia Bridge Co. after 30 years' service, and has opened an office at 301 Union Planters Annex Building, Memphis, Tenn., for general engineering and consulting practice.

Lorne Whiteway has been appointed town engineer of Stellarton, N. S.

Back to Civilian Activity

After 43 months with the Army Engineers, **John J. Lucas** has begun work with Warren O. Van Praag, Inc., consulting engineers, at Decatur, Ill.

Truman P. Young, major, Air Corps, is now associated with **Hunter W. Hanly,** as Hanly & Young, civil and structural engineers at Cincinnati, Ohio.

Ray N. Cruden, lieutenant commander, Seabees, has been employed as project engineer for a sewer expansion program at Stockton, Calif.

Returned from the armed forces to former positions with the St. Clair County, Ill., highway department are: **James Contratto,** engineer of design; **Walter E. Artinger,** assistant engineer; **James B. Vincent,** supervising engineer; and **Charles F. Manion,** testing engineer.

Floyd L. Strawn, lieutenant colonel, and **Thad A. Adams,** captain, of Charlotte, N. C., have resumed their work in the construction field with the V. P. Loftis Construction Co. at Charlotte.

Frederick A. Reickert, lieutenant colonel, Corps of Engineers, is again with Hazelet and Erdal, Chicago, as design engineer.

Charles C. MacCloskey, lieutenant colonel, Corps of Engineers, plans to re-enter general engineering practice on the West coast.

H. J. Johnson, 5th Photographic Reconnaissance Group, is again with the U. S. Engineer Office, St. Paul, Minn.

B. L. Trawicky is back with the U. S. Engineers, St. Paul, Minn., after duty with the 33rd Army Engineer Battalion.

Roy F. Warner, lieutenant colonel, formerly in the Supply Division, Office, Chief of Engineer is now hydraulic engineer with the U. S. Engineers, St. Paul, Minn.

Hugo G. Erickson, major in the Army Air Forces with the Flying Training Command, is now assistant city engineer, Minneapolis, Minn.

Dennis J. McMahon, who served with the 1051st Engineer Port Construction Group, is again with the construction section, U. S. Engineer Office, St. Paul, Minn.

Carl T. Nordstrom, colonel, who served with the Headquarters China-Burma-India Theater is now right-of-way engineer for the Bureau of Public Roads in St. Paul, Minn.

R. Getty Browning, Jr., ensign, U.S.N.R., Civil Engineer Corps is back on his former job with the U. S. Engineer office, Norfolk, Va., as civil engineer in design.

J. W. Beretta, colonel, Corps of Engineers, on terminal leave to March 17, and with 4 years and 8 months military service, is resuming his consulting engineering business as president of J. W. Beretta Engineers, Inc., San Antonio, Tex. He was engineer officer on the General Staff of the Newfoundland Base Command; deputy director for bridges for Technical Division IV on the Engineer Board at Ft. Belvoir, Va., and chief of the physical damage division of the U. S. Strategic Bombing Survey, London. He also served in Germany.

Recently-appointed staff members of the Highway Research Board include, left to right: A. W. Johnson, engineer of soils and foundations; Wainwright Bridges, business manager; F. N. Wray, engineer of design, and G. A. Rahn, engineer of materials and construction.

Dual disposal of garbage and sewage poses problems for treatment plants

Popular demand for home garbage disposal units may add to sewer and plant loads—Downes and Rudolfs honored by N. J. group

Despite numerous differences of fact and opinion on the present status of combined disposal of garbage with sewage, discussion of the subject at the New Jersey Sewage Works Association meeting in Trenton last week found agreement in the belief that the method would gain favor and ultimately pose problems for sewage treatment plant operators.

This 31st annual meeting of the association, held on March 20-22, was designated the John R. Downes Appreciation Meeting in honor of the association's first president and long-time adviser. Mr. Downes, chief engineer of the Dunellen Joint Meeting plant, has made many contributions to the improvement of sewage treatment practice, including development of a floating sludge tank cover, pioneer in the use of sewage gas for power, the heating of digesters and the spray-drying of sludge.

Also honored at the meeting was Willem Rudolfs, chief of the Department of Water and Sewage Research, New Jersey Agricultural Experiment Station, who was made an honorary member of the Federation of Sewage Works Associations. The presentation, given in recognition of Mr. Rudolfs' contributions to sewage works development and his efforts in establishing the Sewage Works *Journal*, was made by J. K. Hoskins, president of the federation.

Garbage and sewage disposal

Championing the water-carriage method of handling ground garbage as he has been doing since 1934, Morris M. Cohn, sanitary engineer of Schenectady, N. Y., and editor of *Sewage Works Engineering*, claimed that the system was the most sanitary method available and that it offered no insurmountable problem either in sewer use or in treatment processing. He predicted that sewer systems will be used for carrying properly ground food wastes because the public will want it; because of the benefits to health and nicety of living that will result; and because the process is desirable, feasible and economically sound.

Mr. Rudolfs, however, took exception to what he called "faulty" published data on volume and strength characteristics of ground garbage. He stated, for example, that published figures reveal that the addition of garbage solids might create an additional load of anywhere from 15 to 200 percent at the treatment plants. "Until more accurate data are available," he cautioned, "one cannot be too precise in predicting ultimate results."

Rudolfs then pointed out that the lower nitrogen content of ground garbage may have an important effect on biological treatment methods; also, that ground garbage would build up a considerable extra biochemical oxygen demand and that garbage solids settle rapidly. This latter characteristic might result in sewer clogging and lead to increased deposits of putrescible matter in grit chambers of the plants.

Although the percentage removal of solids shown by a treatment plant when food wastes are present may be greater than with domestic sewage alone, Dr. Rudolfs claimed that the effluent may still show a much higher solids content and biochemical oxygen demand due to the high initial concentration. This increased BOD he attributed to the soluble organic substances squeezed from ground garbage.

High content of volatile matter in the garbage coupled with the additional volume of solids would require doubled digester capacity in treatment plants according to Rudolfs.

Future outlook promising

Stating that some 50,000 garbage-grinding units were in service in over 300 communities at the outbreak of the war, Mr. Cohn predicted that for many years to come nominal increase in plant loading due to dual disposal can be handled by any treatment works now having sufficient "cushion" capacity. Where existing plants are so loaded that any increment of solids will cause overloading, normal expansion to handle even sewage is called for, he said.

Complete installation of garbage-grinding units is already being considered by three communities, according to Mr. Cohn, with the cost to be borne by the individual householder on a sewer rental basis. One of these communities, he continued, is seriously considering enactment of an ordinance making such installations mandatory.

Officers elected for the coming year include L. J. Fontenelli, chief engineer of the Rahway Valley Joint Meeting treatment works, president; and Leslie West, chief engineer of the Elizabeth Joint Meeting plant, vice president.

Break in sewage dam endangers Ontario town

A serious health menace was created for Acton, Ont.—a village of 3,000 population—on March 16 when a 60-ft. earthen dam impounding a large sewage pond broke, and millions of gallons of polluted water flooded the municipal water reservoir.

It was estimated that 25,000,000 gal. of sewage water was pumped into the mains before the flooded automatic pumps ceased to function.

Local health authorities issued a bulletin promptly warning the public not to use the tap water for drinking or cooking. Pure water was brought into the village by truck from farm wells and from neighboring Georgetown, and other emergency measures were taken.

ENR staff photos

John R. Downes (left) first president of the New Jersey Sewage Works Assn., received Kenneth Allen Award at organization's meeting. Willem Rudolfs (right) received honorary membership in the Federation of Sewage Works Assns.

House investigation shows Alcan road was an outstanding war project

Committee concludes both the U.S. Army Engineers and PRA did good work—Makes recommendations for future of highway

Construction of the Alaska Highway, the Haines Lateral Road, and the Pioneer Trail, constructed preliminary to building the final highway, represents an outstanding war-time accomplishment, a House committee on roads concluded in a 320-page report dated March 12 and released March 22. The project reflects credit upon the Corps of Engineers, the Public Roads Administration and the 81 private construction organizations which worked directly under supervision of the government agencies, the report said.

The committee concluded that the project was justifiable because of the precarious military and naval situations existing in the Alaska area in 1942 and 1943. Also, the location of the highway is described as the most practical route which would have served maximum military requirements.

Arrangements between the U. S. and Canada pertaining to the project were found to be fair and equitable to all parties. Canada's recent agreement to continue maintenance of the highway network dissipates any argument that the highway's postwar economic and military value is questionable, the report said.

Equipment rentals not high

Other major conclusions of the committee are: (1) equipment rentals paid by the PRA were considerably lower than by the average rental for equipment in the U. S.; (2) rentals paid by the Army Engineers were higher than those paid by PRA, but were less than three-fourths of the maximum rates established by the Office of Price Administration; (3) no equipment of any value was abandoned along the highway; the amount of equipment retained in the area for operation and maintenance of the project was not excessive; and (5) much larger quantities of material were brought into the area than were actually needed for construction, but this was a necessity because of the speed with which the work had to be done.

The investigation revealed no serious mistakes in the way the contracts were handled for the construction of the Haines Road, which was built by an Army contractor after being started by a firm employed by the PRA.

Wyman exonerated

Regarding the Haines Road, the committee concluded; "This contract was made by the War Department with Foley Bros., Inc., and Rohl-Connolly Co. After the Public Roads Administration had started its construction. The charge made by some that favoritism was shown by Col. Theodore Wyman, Jr., in bringing in Foley Bros., Inc., and Rohl-Connolly Co. is not supported by the evidence. Several other large contractors were considered but those companies declined to negotiate for a contract. Colonel Wyman was relieved before these negotiations were completed.

Recommendations for road's future

Recommendations regarding the future of the project were outlined by the committee as follows:

I. The U. S. and Canada should give early consideration to the formation of a joint commission to exercise responsible control over the maintenance and operations of the highway, the Haines Lateral Road, and such feeder roads as now compose or shall compose later an integral part of the through highway system running from the U. S. to Alaska.

II. Such a joint commission, when formed, should institute an immediate survey to determine the probable cost of improving, realining, and hard surfacing this through route.

III. The secretary of the Interior should make available immediately for settlement the corridor of public lands in Alaska through which the Alaska Highway and the Haines Lateral Road now run so that service station, hotel, and camping facilities may be established along these routes by private citizens.

IV. The provisions of the Federal-Aid Highway Act, Public Law 521, should be extended to cover road building operations in the territory of Alaska, but an exception should be made so that the territory, should not be assessed more for its share of the cost of these improvements than it can equitably bear.

V. The Haines Lateral Road should be repaired and placed in usuable condition for year-round service as soon as funds can be authorized for this work.

C. S. Strike completes AMG service in Germany

Clifford S. Strike, who served as chief of the building materials, construction and forestry office of the American Military Government for Germany since July, 1945, returned to the United States recently to resume his duties as president of the F. H. McGraw and Co., engineers and constructors.

Commenting on the activities of his office, Mr. Strike said that temporary housing facilities were provided for about four million Germans in the American Zone—an action dictated by the Army's primary interest in protecting its personnel by curbing epidemics and unrest in the zone.

Asked how closely the plan now being worked out by representatives of the Allied Governments compares with the plan to minimize the military potential of German industry issued by the Engineers Joint Council last fall (*ENR* Oct. 4. vol. p. 415), Mr. Strike said that final conclusions of the Allied control group were very close to those of the society presidents. The control group went contrary to society presidents in two respects. They did not require elimination of Germany's synthetic oil production plants because the country lacks supplies of natural oil; and they did not prohibit production of metallic aluminum, but they did prohibit the production of the basic raw material.

Out-of-gas service fee aids Bay Bridge traffic

A fee of $5 recently inaugurated for servicing cars out of gas on the San Francisco-Oakland Bay Bridge induced such caution on the part of bridge patrons during the first 4 weeks of its use that the number of such cars was reduced more than 50 percent. The service fee is designed to aid the flow of traffic, which recently has been nearing the 80,000 vehicle per day capacity of the bridge.

Expectations of Bay Bridge engineers were exceeded during the initial period of its use. In the 4 weeks prior to Feb. 15, when the $5 "fee" went into effect, 330 cars ran out of gas on the bridge; in the 4 weeks after Feb. 15, only 158 cars had to have gas service.

One of the tools used by bay bridge traffic engineers is a traffic timer, which measures the speed of individual cars. The timer consists of two rubber tubes, 29 ft. apart, stretched across the lane where observations are desired, which transmit a pneumatic impulse to the measuring device as a car runs over them. The measuring device indicates the time required to travel the 29 ft. between the two tubes and has a conversion scale so that a direct reading in miles per hour may be taken. To operate this device an observer is required. Speeds up to 80 mph. have been recorded on the bridge where the wartime speed limit of 35 mph. is still being used.

A survey of the current conditions in the engineering schools

(Second of a series of reports from leading technical institutions)

Union College, Schenectady, N. Y.—"We shall not receive engineering students until the term beginning Sept 14, next. At that time we shall be able to take more engineering students in both the upper and lower classes.

"Our accommodations for married veterans are very limited but we expect to have some housing granted to us by the government for use in September.

"We offer refresher courses in our extension division.

"We anticipate announcing an entirely new program for our engineering students for the September term. We have been on the 3-term basis since July 1, 1943, and expect to return to the 2-semester plan in September."—C. F. Garis, Dean.

The University of Nebraska, Engineering College, Lincoln, Neb.—"It is possible to receive more students in the upper classes, definitely favoring former students and citizens of Nebraska. Freshman class is about 70 percent larger than any previous freshman class. Impossible to accept more freshmen until the summer session.

"Housing still available for single men. Situation critical for married men. Some relief quite possible before fall.

"The college has been studying the entire educational program for over a year. Changes doubtless will result. No refresher courses but we recommend that veterans repeat courses fundamental to the remaining program. Men who come between registration periods are encouraged to carry on such review as a constructive part of their education. Successful engineers are obliged to do the same kind of review work continuously after graduation."—Roy M. Green, Dean.

University of Washington, Department of Civil Engineering, Seattle, Wash.—"I am afraid that the saturation point has been reached as the registration in the university for the spring semester probably will reach 12,000. We have 3100 veterans on the campus. There is a lack of sufficient class rooms and laboratories, offices, and faculty. Funds were provided by the last legislature for a new civil engineering building, plans are completed but the drastic condition of the building industry is holding back the letting of bids.

"At the moment the university is moving in 99 portable houses from the Hanford project. These are for married couples, but there are already 450 applications on file. The university is also moving 24 barracks from the Rinton housing project to house 850 single students. At present 250 applications are on file for these accommodations.

"Beginning next October, the College of Engineering will start on a completely revised and revitalized curriculum, agreeing very closely with that recommended to the Board of Direction by the A.S.C.E.'s committee. We are offering refresher courses in mechanics and mathematical analysis, and arrangements have been made for auditing certain courses as another means of taking refresher work. In this case the veteran is given subsistence credit for ¾ of the credit normally carried on the course."—R. B. Van Horn, Head, Department of Civil Engineering.

Louisiana State University and Agricultural and Mechanical College, Baton Rouge, La.—"We cannot offer housing accommodations to any 'out of state' students (except former ones) whether married or unmarried. We hope to accommodate all eligible students. Summer school registration on June 7-8 and for the session 1946-47 in Sept. 12-16.

"We allow veterans to take refresher courses, and we have added a considerable number of new courses in the College of Engineering. We are adding a new curriculum in industrial engineering as an option in mechanical engineering, and in hydraulic engineering, at both the undergraduate and graduate levels. We are expanding our offerings in electronics, and in chemical and aeronautical engineering."—W. P. Wallace, Asst. Professor of Civil Engineering.

Syracuse University, College of Engineering, Syracuse, N. Y.—"We can take additional students in the upper classes, but the freshman and sophomore classes will have a limited enrollment of 200 for entering students.

"We will take in students on May 13 and are making great efforts to obtain housing for married men. We already have sufficient accommodations for single men.

"Refresher courses are being given in mathematics and opportunity is being given young men to review work which they had taken prior to the war in order to enable them to carry on their new work successfully."—F. G. Crawford, Vice-Chancellor.

(To be continued)

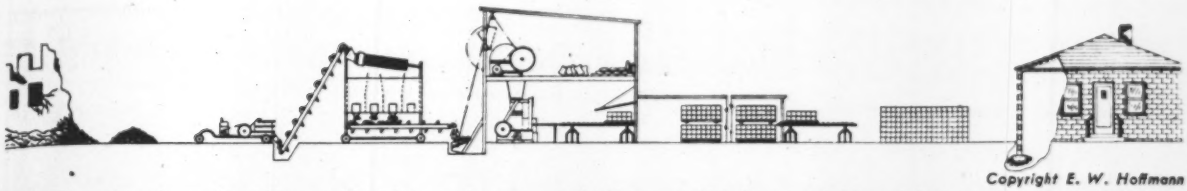
World-wide photo

Cornell provides housing for married veterans

"Vetsburg" is the name given to this group of temporary houses erected near the Cornell University campus, Ithaca, N. Y., to provide housing for students who are married veterans. They are occupied by 100 such families.

Each of the houses, obtained through the Federal Public Housing Authority, contains two apartments with living room, bedroom, kitchen alcove, and bath. Available only to married veterans, the apartments rent for $35.00 a month, including all charges except electricity.

A similar development is being provided at the Massachusetts Institute of Technology, while at the University of Colorado 200 trailer units are being used to alleviate the student housing shortage (ENR Jan. 17, vol. p. 92).



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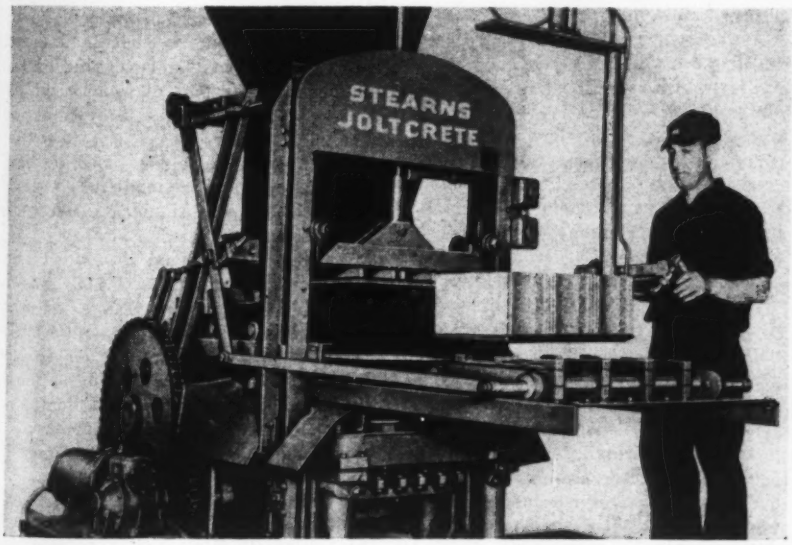
Scheme drawing shows "train" assembled for use in war-wrecked areas. At left, a portable crusher receives the rubble, and delivers crushed stone to an elevated separator, which grades the material, then passes it to a mixer and block-making machine

A bomb landed here, and its blast reduced surrounding buildings to piles of rubble. Using American-built equipment, builders are converting the debris into aggregate for concrete block which are being used extensively for rebuilding.



One type of block-making machine, assembled as part of a "train" to convert rubble-aggregate into usable concrete block.

Rubble yields materials for Europe's rebuilding

American machinery converts debris into aggregate for concrete blocks used for new homes

One of the oldest known methods of "prefabrication" of homes is already at work on a large scale, rebuilding the wreckage of European cities into livable dwellings.

The method—according to George W. Hoffmann, concrete consultant of New York City, and developer of machinery being used—is the use of concrete block, with aggregate made of the rubble of war-wrecked stone and brick structures.

As shown in the accompanying sketch, a "machinery train", developed by Mr. Hoffmann, is assembled for the work in war-ruined cities. The train consists of a crusher, an elevated classifier and storage bin, a concrete mixer, a vibrating block machine, and a curing section. Such a "train", capable of producing materials sufficient for two one-family houses in an eight-hour day, costs somewhat less than $18,000 delivered to a seaport nearest the manufacturing plant, it was said.

Construction methods when using these precast blocks are simple enough to permit erection by unskilled labor, and the machinery itself can be operated with a minimum of skill.

Prefabricated building units of the concrete block type are as old as construction itself. Ancient Roman builders mixed pumice and porcelain dust, and in Italy and Germany simple molding machines compacting concrete into building block have been in use for more than a hundred years.

Resulting construction is permanent, firesafe, and proof against insect ravages.

The block also provides insulation against humidity, heat or cold, and becomes a soundproof wall.

More extensive use of concrete block or cinder block has been suggested for the United States, as a means of easing the current housing shortage. The simplicity of design possible, and the sturdy construction resulting, as well as availability of the materials, are cited as ample reasons for use of the block.

DEVELOPMENTS BEYOND U. S. BORDERS

Digested from reports by Engineering News-Record correspondents and the McGraw-Hill World News Bureau

Complete surveys for world's highest oil pipeline—Egypt plans electrification at Aswan Dam—Chinese road program announced

Williams Brothers Corp. of New York has completed the profile survey and will soon start construction on what is reported to be the highest oil pipeline in the world—a 6-in. steel conduit that will scale ranges on the eastern slope of the Andes Mountains in Bolivia to reach an elevation of 9,860 ft.

Design and construction of the 255-mi. line, which leads from the Camiri oil fields to a rail terminal at Tintin, is being financed by a Bolivian government agency, Yacimientos Petroliferos Fiscales Bolivianos. Cost of the work, including three pumping stations and the loading terminal, is $5,250,000. Initial capacity of the line is 6,000 bbl. daily at 1,500-lb. pumping pressure.

Aside from the anticipated construction difficulties incident to the rugged terrain over which the pipe will be laid, many problems must be faced in getting pipe and equipment to location. To reach the area, shipments will go from New York by boat to Antofogasta in Chile and thence by rail to Tintin by way of Oruro and Cochabamba.

The rail line which crosses the Andes Mountains is characterized by sharp turns and narrow clearances and this will necessitate cutting the normal 40-ft. lengths of pipe in two for shipment. The pipe is 6⅝ O.D., grade B, steel seamless tubing; it will be joined with electric welds.

W. E. Rea, in charge of the project at the New York office of Williams Brothers, said that one shipment of construction equipment has already left this country, including 25 bulldozers, 40 trucks, 3 road patrols, 15 welding machines, as well as compressors, trailers, rooters and camp equipment. The major problem at the moment is to obtain pipe in the United States for the project.

Bolivia pipe joins oilfields, railhead

Power . . . . .

Egypt—Plans and specifications are nearing completion for construction of a $35,000,000 hydro-electric power project at Aswan Dam on the Nile River in Egypt. It is expected that bids will be opened and contracts awarded by early summer. Construction of the generating station, which is expected to require about three years, is planned to develop the waterfall at Aswan reservoir. The station will have an installed capacity of approximately 375,000 kw.

A new department of the Egyptian government, designated the Department for the Electrification of Aswan Dam, has just been established to do the work, under the supervision of the Aswan Dam Hydro-Electric Power Commission headed by Dr. Abel Aziz Ahmed Bey. Kennedy & Donkin of London are the consulting engineers on the project.

Financing will be by internal or locally subscribed loans, rather than by inclusion in the regular government budget. In the near future plans and specifications will be made available at the Egyptian Legation in Washington, D. C., and also in Cairo and London.

Aswan Dam is of granite construction and has been raised twice. The original project, which called for a reservoir level of El. 106, was begun in 1898 and completed in 1902. The first heightening, completed in 1912, was designed to increase the reservoir level to El. 113. The second raising, completed in 1933, brought the maximum reservoir level to El. 122 with a capacity of about 4,000,000 acre-ft. The length of the dam is slightly over 1⅓ mi.

Puerto Rico—A gravity type, 220 ft. high dam, impounding a reservoir on the Coanillas River with a surface of 625 acres, is under construction at Coanillas in Utuado municipality. Costing $6,109,530, the project represents the largest hydro-electric power development in the Caribbean and is designed to add 57 million kw hours to Puerto Rico's power supply.

A central power plant of 24,000 h.p. capacity also will be constructed on the south end of the Dos Bocas hydro-electric plant built several years ago by the Puerto Rican Reconstruction Administration with U. S. Federal aid. The new plant will operate with an expected run-off of 528 ft. with currents to be brought through a four mi. tunnel. The project will increase the Dos Bocas output by 4 million KVH annually.

Irrigation . . . . .

Argentina—A dam that would create an artificial lake with a surface of 20 square miles will be built near the foot of a canyon on the Atuel River in central Mendoza province. The water would irrigate 270 square miles for cultivation of alfalfa, fruit and vegetables.

The Atuel River rises high in the Andes and first flows westward and then to the south. In its upper reaches, it flows for 60 miles through a relatively level plain, then in a 25-mile canyon in the course of which it drops 2000 ft.

The projected $817,000 dam—to be 80 ft high and 1000 ft. long—will be a concrete structure located near the foot of the canyon at a point 50 miles from San Rafael—just above the falls at El Nihuel. Plans also call for development of a 55,000 horsepower of electric power.

Railroads . . . . .

Colombia—Approximately 870 miles of new railroad construction will be required to form a proposed 1400-mi. direct rail link between Bogota, capital of Colombia, and the port of Concha on the southern end of Lake Maracaibo in Venezuela.

The new line, elements of which have been surveyed and are ready for construction, will have a significant effect on trade between the two countries. Lake Maracaibo is connected with the Caribbean by an open channel and thus is accessible to oceangoing vessels. At present, a minimum of eight days and average of three weeks is required for freight landed at Barranquilla (at the mouth of the Magdalena River) to reach Bogota by river steamer. By having Concha as a rail terminal, shipments can be made in 24 hours.

The existing 362 mi. Northern Railroad of Colombia, running from Bogota to Barbosa, will be incorporated into the new line. Between Barbosa and Bucaramongo, capital of Santander province,

381 mi. of new line have been surveyed in preparation for early construction. A new line totalling 240 mi. will be required from Bucaramongo to Pampalona. Funds already have been appropriated for a 54 mi. section between Pampalona and El Diamente. The existing 69 mi. line connecting El Diamente with Cucuta will have to be rebuilt.

The 96 mi. of track between Cucuta and the Venezuelan frontier, known as the Cucuta Railroad, connects with the 192 mi. Venezuelan line—the Tachira Railroad. This Venezuelan line runs from the frontier of Colombia to the port of Encontradas on the Catatumbo River. It is proposed to utilize 65 mi. of the line running from the frontier to El Guaabo, from where 128 mi. of new line will be needed to complete the link to Concha.

Mexico—Funds are now available for completion of the southeastern railroad linking Mexico City with the states of Campeche and Yucatan. About 180 miles of new construction is required to finish the project started in 1936. Chief remaining task is placing bridges, although most of the grading and other conditioning has been done. The main line of the railroad is 500 mi. long.

Highways . . . . .

China—Construction of 118,430 miles of new highways is the goal of the Chinese National Government's new five-year road building program. Some 90 foreign engineers and technicians will be sought as advisers for the project, which will utilize a labor force of about a half million.

The projected network of trunk lines will connect the strategic centers of Chungking, Hankow and Sian with a number of large cities including Nanking, Kunming, Hangchow and Peiping, by modernizing existing roads. Branch lines will be built by recruiting laborers from adjacent areas.

The National Government will control all trunk roads and their branch lines, while secondary roads will be administered by the provinces. The program envisages construction along the national highways of hundreds of motor repair shops, road maintenance centers, radio stations and 36,880 miles of telephone lines.

Puerto Rico—A comprehensive six-year public works program for this U. S. insular possession involves spending $10,700,000 on construction of more than 700 mi. of secondary and municipal roads and $8,600,000 for improvement of 128 mi. of principal roads and 136 mi. of other highway.

Urban Improvements . . . . .

Venezuela—At least five Venezuelan cities have adopted public works programs aimed at relieving traffic congestion. The capital, Caracas, has taken the lead by instituting a number of building restrictions designed to facilitate widening of principal streets and by condemning a number of buildings in preparation for construction of a super boulevard, along which it is predicted the chief shopping district will be located. Widening of principal streets also will be done in Maracaibo, San Cristobal, Turmero and Maracay.

These projects already are under contract at a cost of $11,200,000 and are expected to be completed in 18 months. Other parts of the program, including extensive slum clearance, will be undertaken as funds become available.

Mexico—Making the Pacific coast resort city of Acapulco the "Riviera of the Americas" is part of a comprehensive development scheme that will cost about $32,000,000.

Principal projects called for in the master plan for urbanization of the resort are: 1. a water supply and distribution system; a drainage system estimated to cost $4,000,000; completion of a coastal highway with double traffic lanes, walks for pedestrians, and landscaping; 2. development of a park from Caleta to Caletilla, a scenic area bordering excellent beach. The plan also provides for the construction of a school center for 700 students on land already donated.

U. S. owns $3 billion worth of property abroad

The U. S. Government still owned or controlled military installations abroad representing an investment of $3 billion as of Sept. 30, 1945. Included among the almost 2000 facilities awaiting disposal at this date were air ports and air bases, representing 40% of the total investment; harbor and transportation facilities; living quarters, hospitals and storage depots. These installations are in addition to an estimated 1000 now under army control in Pacific areas.

A thousand disposals had been made in 50 countries prior to the Sept. 30 accounting. Disposal involves returning to foreign owners property acquired through reverse lend-lease, rented or commandeered; transfers to other U. S. government agencies or the Office of the Foreign Liquidation Commissioner for disposal; or destruction, dismantling and abandonment with accompanying salvage of need materials. For permanent improvements resulting from U. S. military construction in Canada, the Canadian government already has paid $77 million.

Sovfoto

Moscow begins addition to subway

Russian sources said last week that the government has started construction work on a new Moscow subway line that will add 12½ miles—about 50 percent.—to the city's present underground trackage.

The new line will link various outlying suburban sections and the major surface railroad stations, in a complete circle around the outer perimeter of the city, to serve a population of more than 4,000,000.

OBITUARY

Roy Durwent Garner, 61, general manager and chief engineer, Central Vermont Railway, died at St. Albans, Vt., March 9. Born in Waverly, Iowa, Mr. Garner entered the employ of the Chicago and Great Western R. R. in 1905 and in 1907 went to Buffalo, N. Y. Six years later he entered the New England railway engineering field with the Central Vermont.

Frederic Daniel Cosner, 73, retired construction engineer, and former mayor of Dade City, Fla., died March 9.

V. R. Andrus, 57, steel engineer at Kansas City, Mo., for 33 years, died recently.

Maj. Herbert C. Merrill, 48, veteran engineer of two wars, died at Hingham, Mass., March 13. Born in Quincy, Mass., he was educated at Massachusetts Institute of Technology. After service in World War I, he was assistant superintendent of Bush Terminal, Brooklyn, N. Y. In World War II, he was attached to the 3rd Army Engineers, taking part in the bridging of the Rhine for early crossings of American troops.

Clarence Sidney Timanus, 53, member of Burns & McDonnell Engineering Co., Kansas City, Mo., died March 12. Upon graduation from Massachusetts Institute of Technology and Harvard University in 1918 he entered the company, and in 1930 became a partner and member of the firm. He had specialized in hydraulic, sanitary, and structural engineering, and among the projects over which he had personal direction were the enlargement and improvement of the water filtration plant at Cincinnati, Ohio, and the design and construction of the lake water supply, purification plant, and municipal power plant at Springfield, Ill. In 1942-43 he was architect-engineer on the construction of Smoky Hill Airbase, Salina, Kan., which had the longest and largest runways of any Army air base.

Karl Weatherbe, 75, died at Montreal, Que., March 7. In 1897 he became professor of engineering at King's College, Halifax, N. S., and held that position until 1904 when he returned to his practice as an engineer.

Howard Snelling, 69, retired civil engineer of Pittsboro, N. C., died March 6. He received his civil engineering degree at Massachusetts Institute of Technology and later attended Harvard.

John Preston Forde, 73, engineer, died at Esquimalt, B. C., recently. He constructed the Esquimalt drydock. Having studied engineering in Ireland he went to Canada in 1891. In 1903 and 1904 he was with the engineering and construction department of the Great Northern Railway, and then became division engineer for the Canadian Pacific Railroad at Revelstoke. After seven years he became district engineer for the federal Public Works Department at Nelson. In 1933 he went to New Westminster to have charge of all dominion public works for British Columbia and Yukon Territory.

"Lifestream of the City"

Produced to illustrate to city officials, city planning agencies, and the general public the benefits of a well planned, efficient public transit system, is the new all-color General Electric sound movie "Lifestream of the City."

The movie is now available to civic and business organizations, schools, colleges and transit and power companies.

The film uses vivid animated charts and colorful action shots to show that public transit is indispensable to the prosperity of community life, business and municipal government.

ENGINEERING SCHOOL NEWS

Building program for M.I.T. and Stevens—New department of engineering sciences at Harvard—Milwaukee teaches road building.

Plans have been announced for an expansion program at Massachusetts Institute of Technology, Cambridge, Mass. This includes $9,250,000 for new buildings and improvements. The corporation has authorized expenditure of $5,500,000 immediately—including $700,000 for modernization of existing buildings and re-arrangement of laboratories and other facilities for peace time operations. Among the new buildings planned are a gymnasium-auditorium for which funds are available; a gas-turbine laboratory; new hydraulics laboratory, construction of which will be begun this year; a machine tool laboratory; and a nuclear science laboratory. More than one-half million dollars have been contributed by General Electric, Westinghouse Electric Corp., Curtiss-Wright Corp., United Aircraft Corp., and General Machinery Corp.

Proposed physical expansion of Stevens Institute of Technology, Hoboken, N. J., involving $1,425,000, was outlined recently by Harvey N. Davis, president, at the annual dinner of the alumni association held on the 76th anniversary of the establishment of Stevens.

The program, for buildings and improvements on the campus and at the Stevens Engineering Camp at Blairstown, N. J., includes: Building of The Charles Stewart Mott Field House, the contract for which has been let; purchase of an apartment house to be used by married veterans on the staff and in the undergraduate body; purchase of a dwelling house at 809 Castle Point Terrace whose grounds abut on the present campus and which will become Stevens' sixth permanent dormitory; Women's Campus Committee work to improve the grounds of the college; and a buildings and grounds building.

Construction of five buildings was proposed by President Davis to complete a ten-point betterment program: the Kidde Memorial Laboratory of Physics; the Peirce Metallurgy Laboratory; the Robert C. Post Memorial Power Plant; a soil mechanics and limnology laboratory at Stevens Camp; and a new library building on the campus.

"Construction of the Kidde Memorial Laboratory of Physics will be the second step in establishing a Science Center at Stevens," Mr. Davis said. "It will be built adjacent to the Morton Memorial Laboratory of Chemistry, and when the proposed Peirce Metallurgy Laboratory is finished, the Science Center will be complete."

A new department of engineering sciences and applied physics will be created at Harvard University, according to an announcement by Dean Paul H. Buck, provost. The new department has been granted $2,000,000 from the McKay Endowment and its purpose is "to replace a generation of scientists and engineers lost by manpower diversion" during the war, and to meet the needs of industry for research engineers. Chairman of the new department is Frederick V. Hunt, professor of communication engineering, who was in charge of Harvard's underwater sound laboratory during the war.

A new approach to practical schooling in road building equipment has been launched by The Heil Co., Milwaukee, Wis., in establishing a "pilot" class for its field service men at the Milwaukee School of Engineering. The company selected 20 men from its service and production departments for screening and a series of aptitude tests. The five men who received the highest ratings were appointed to take an intensive training course with a curriculum which was worked out jointly by the school and company.